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(71) Applicant(s)

**TVEyes.com, Inc**  
(Incorporated in USA - Delaware)  
2150 Post R Road, Third Floor, Fairfield,  
Connecticut 06430, United States of America

(72) Inventor(s)

**James H Hayter**  
**David J Ives**

(74) Agent and/or Address for Service

**Withers & Rogers**  
Goldings House, 2 Hays Lane, LONDON, SE1 2HW,  
United Kingdom

(51) INT CL<sup>7</sup>

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(54) Abstract Title

**Keyword searching of closed caption television programming on multiple channels**

(57) A computer system is used to automatically search closed-captioned television for information requested by a user (ie a keyword). The system may be front ended by an Internet site, where closed-captioned television programming is searched in real time for the requested information. Upon finding the requested information, the user is notified by email, voice mail etc, as to the programme name, broadcast time, broadcast channel. The user may also access a video segment of, or additional textual information from, the identified programme.

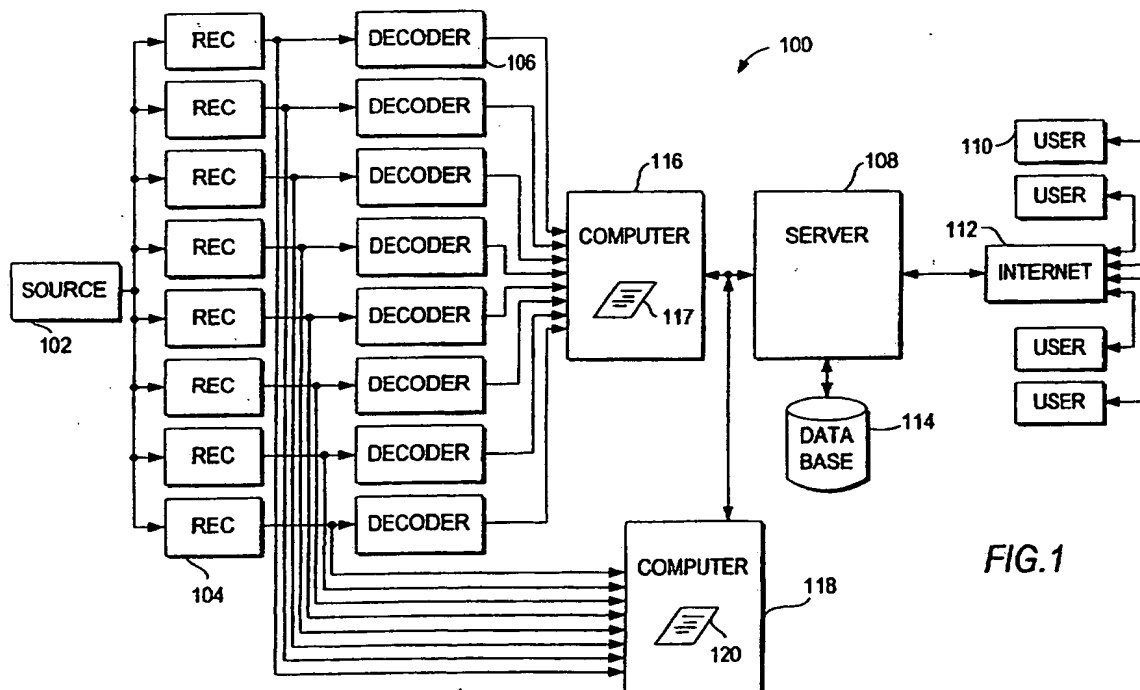


FIG.1

GB 2 358 938 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print incorporates corrections made under Section 117(1) of the Patents Act 1977.

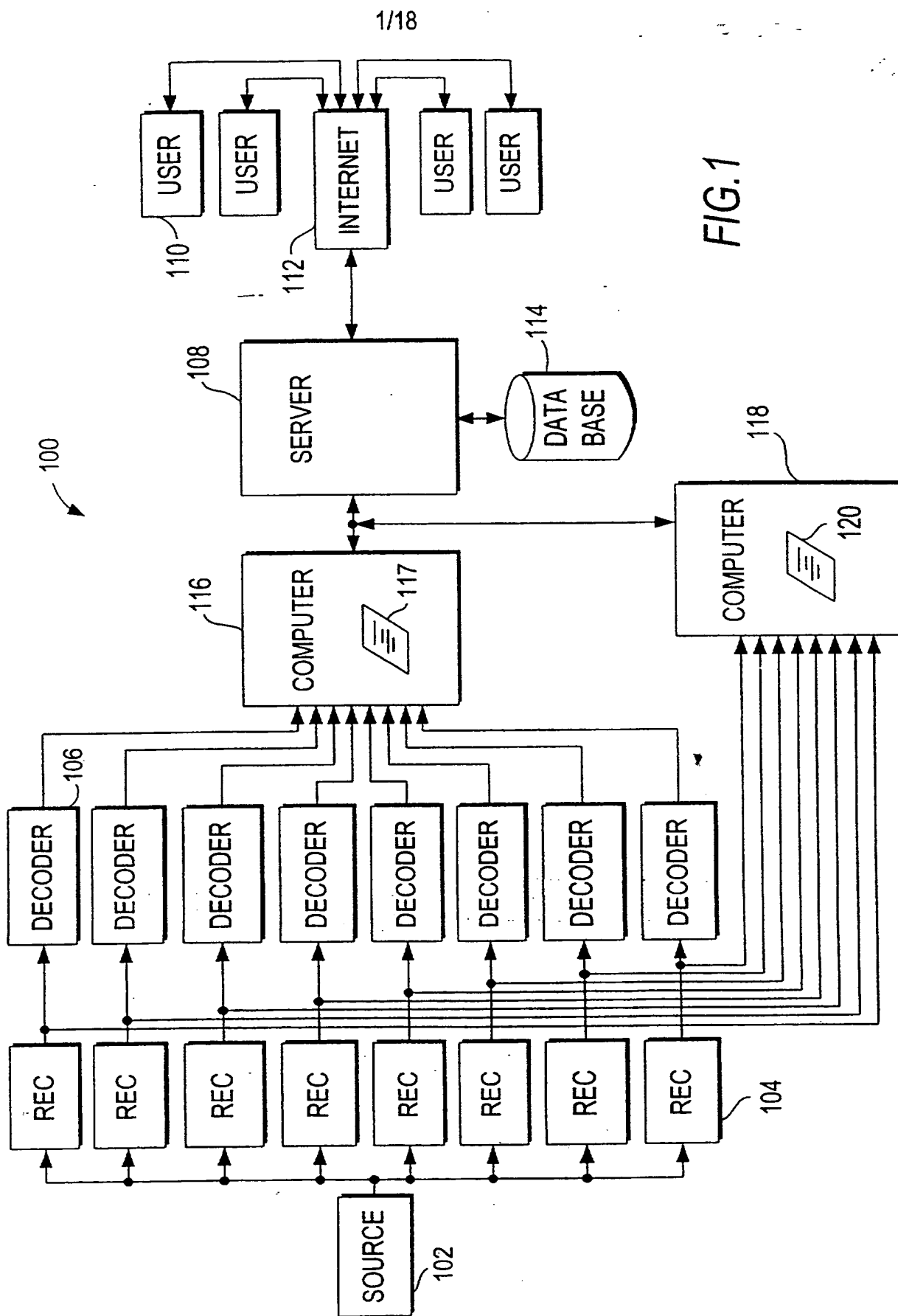


FIG.1

200

CLOSED - CAPTIONED TELEVISION PROGRAMMING  
SEARCH

PLEASE ENTER YOUR EMAIL ADDRESS AND  
THE KEYWORD OR PHRASE YOU WANT US  
TO SEARCH FOR. IF YOUR KEYWORD OR PHRASE  
IS FOUND, YOU WILL BE NOTIFIED BY EMAIL.

EMAIL:  202

KEYWORD  
OR PHRASE:  204

*FIG. 2*

300

CONFIRMATION 302

YOU HAVE ENTERED " TV EYES " AS YOUR KEYWORD.

WHEN YOUR KEYWORD IS FOUND, WE WILL NOTIFY  
YOU AT YOUR EMAIL ADDRESS, USER@USERSYS.COM 304

MODIFY YOUR ENTRIES 306

*FIG. 3*

400

KEYWORD	PHRASE	ADDRESS	MAXDAI	USERMAX	TRALLER	ORIGDATE	LASTDATE	TOTALSENT
MICROMEM		ACCUMULATE@WORLDNET.ATT.NET	3	0		9/7/99		0
SLM		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
RAND		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
HUMMINGBIRD		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
GEAC		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
INFORMISSION	INFORMISSION GROUP	STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
DATAMIRROR		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
COGNOS		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
COREL		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
CERTICOM		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
CGI	CGI GROUP	STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
BCE	BCE EMERGIS	STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
IDT	IDT CORPORATION	BILL.CTR.EGGLESTON@FAA.GOV	3	0		9/7/99		0
JETFORM		STEPHEN_MATYASFALVI@SOCTIAC	3	0		9/7/99		0
DR	DR ALARCON	BRONCO48@JUNO.COM	3	3		9/7/99		0
EXODUS		RSURFER@HOME.COM	3	0		9/7/99		0
LUCENT		M.BONE@WORLDNET.ATT.NET	0	0		9/7/99	9/7/99	3
QUALCOM		M.BONE@WORLDNET.ATT.NET	3	0		9/7/99		0
GEORGE	GEORGE SOROS	TRADERGEO45	3	0		9/7/99		0
INKTOMI		RSURFER@HOME.COM	3	0		9/7/99		0
BROADCOM		RSURFER@HOME.COM	3	0		9/7/99		0
IDEOLOGY		AMCCRAY@GEOCITIES.COM	3	0		9/7/99		0
TREX		SPAM@PHOG.COM	3	0		9/7/99		0
KANA		JOSEPHA@BEST.COM	3	0		9/7/99		0
BOEING		M.BONE@WORLDNET.ATT.NET	3	0		9/7/99		0
HARMONICS		M.BONE@WORLDNET.ATT.NET	3	0		9/7/99		0
CALIFORNIA	CALIFORNIA AMP	EJHWANG@DELLNET.COM	3	0		9/7/99		0
ASP		GABBU23@HOTMAIL.COM	3	0		9/7/99		0
ISUZU		SFMGPK@SCFN.THPL.LIB.FL.US	3	0		9/7/99		0
SLM		RALPH_GARCEA@SCOTIAMARKETS.	3	0		9/7/99		0
IDT		SPAM@PHOG.COM	3	0		9/7/99		0

FIG. 4A

406

404

402

400

TOTALS	SKIPPED	NEWS	FINANCE	KIDS	ENTERTAIN	POLITICS	MISC	SPORTS	STOP	REPEATS
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0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
0										

**FIG. 4B**

PROGRAMTYPE	CATEGORY
1ST SYN.	MISC
ARTS	MISC
CARTOON	KIDS
CINEMA	ENTERTAIN
CRAFTS	MISC
DAYTIME SOAP	MISC
FILLER	MISC
FINANCE	FINANCE
GAMES	MISC
HEALTH	MISC
INSTRUCTIONAL	MISC
KID SHOW	KIDS
KIDS	KIDS
MISC.	MISC
MOVIE	ENTERTAIN
MUSIC	ENTERTAIN
MUSICAL	ENTERTAIN
NEWS	NEWS
PELICULA	MISC
PUBLIC AFFAIR	POLITICS
RELIGIOUS	MISC
SERIES	MISC
SPECIAL	MISC
SPORT	SPORTS
SYN.	MISC
TALK SHOW	MISC

500

FIG. 5

502

504

FIG. 6

DATE	TIME	STATION	TITLE	TYPE	CATEGORY	CC
6/3/99		WNYW	MAD ABOUT YOU	SYN.	SITCOM	(CC)
6/3/99		WWOR	NEWSRADIO	SYN.	SITCOM	(CC)
6/3/99		WEDW	OFF AIR	SIGN-OFF		
6/3/99		WPIX	CHEERS	SYN.	SITCOM	(CC)
6/3/99		NEWS12	OFF AIR	SIGN-OFF		
6/3/99		WNET	DOMESTIC DIFFERENCES	SPECIAL	PROFILE	
6/3/99		MSG	FOX SPORTS NEWS	SPORT		
6/3/99		MSGMG	ON THE TENS	PUBLIC AFFAIR	COMMUNITY	
6/3/99		MSGTW	OVERNIGHT UPDATE	PUBLIC AFFAIR	CURRENT EVENTS	
6/3/99		DSC	SCIENCE MYSTERIES	SERIES	SCIENCE	
6/3/99		EWTN	OUR LADY OF THE ANGELS MONASTER	RELIGIOUS		
6/3/99		WTXX	MARRIED... WITH CHILDREN	SYN.	SITCOM	(CC)
6/3/99		WTIC	MAD ABOUT YOU	SYN.	SITCOM	(CC)
6/3/99		NICK	BRADY BUNCH	SYN.	SITCOM	
6/3/99		LIFE	GOLDEN GIRLS	SYN.	SITCOM	(CC)
6/3/99		CNBC	RIVERA LIVE	TALK SHOW		
6/3/99		TNN	DUKES OF HAZZARD	SYN.	ADVENTURE	(CC)
6/3/99		FAM	SHOW ME THE FUNNY	SERIES	COMEDY	
6/3/99		VH1	VH1 ROCK	MUSIC	ROCK	
6/3/99		MTV	BLAME GAME	GAMES		
6/3/99		CNN	LARRY KING LIVE	TALK SHOW		(CC)
6/3/99		SCIFI	SLIDERS	SERIES	SCIENCE FICTION	(CC)
6/3/99		ACCS	LOCAL ACCESS	MISC.		
6/3/99		WXTV	LO MEJOR DE "AL RITMO DE LA NOC	SERIES	VARIEDAD	
6/3/99		ESPN	BASEBALL TONIGHT	SPORT	BASE	
6/3/99		FOXNY	LAST WORD	SPORT	SPORTS TALK	
6/3/99		USA	SILK STALKINGS	SERIES	CRIME DRAMA	(CC)
6/3/99		A&E	BIOGRAPHY	SERIES	PROFILE	(CC)
6/3/99		BET	SPARKS	SYN.	SITCOM	(CC)
6/3/99		HLD	HEADLINE NEWS	NEWS		(CC)

600

6/18

700

**USER ACCOUNT LOG-IN**

**DO YOU ALREADY HAVE A PASSWORD?**

---

<b>YES</b>	<b>NO</b>
<b>PLEASE LOG IN</b>	<b>PLEASE GET PASSWORD</b>
EMAIL <input style="width: 100%;" type="text"/>	EMAIL <input style="width: 100%;" type="text"/>
PASSWORD <input style="width: 100%;" type="text"/>	PASSWORD <input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="button" value="ENTER"/>	<input style="width: 100%;" type="button" value="SUBMIT"/>

**FIG. 7**



USER ID #	ADDRESS	PASSWORD	VALIDATED?	ORIGDATE	LASTDATE	TOTALVISITS
1788	RALPH_GARCEA@SCOTIAMARKETS.	SOFTWARE	<input type="checkbox"/>	9/7/99	9/7/99	1
1793	KELLI@ACCELERATION.NET	SMILEYGIRL	<input type="checkbox"/>	9/7/99	9/7/99	2
1792	SOUPGAL@HOTMAIL.COM	JOHNTS	<input type="checkbox"/>	9/7/99	9/7/99	2
1791	TAMMYREED@HOTMAIL.COM	CHANG	<input type="checkbox"/>	9/7/99	9/7/99	2
1789	EJHWANG@DELLNET.COM	9999	<input type="checkbox"/>	9/7/99	9/7/99	1
1787	RALPH_GARCEA@SCOTIACAPITAL.C	SOFTWARE	<input type="checkbox"/>	9/7/99		0
1786	STEPHEN_MATYASFALVI@SOCTIAC	MIDESIGN	<input type="checkbox"/>	9/7/99	9/7/99	1
1785	KOLYAVASYA@USA.NET	STICKYFINGERS	<input type="checkbox"/>	9/7/99	9/7/99	1
1784	BRONCO48@JUNO.COM	GILKUS	<input type="checkbox"/>	9/7/99	9/7/99	1
1782	ACCUMULATE@WORLDNET.ATT.NET	T2135	<input type="checkbox"/>	9/7/99	9/7/99	1
1781	M.BONE@WORLDNET.ATT.NET	SKIPPY	<input type="checkbox"/>	9/7/99	9/7/99	1
1780	RSURFER@HOME.COM	ELMOSURF	<input type="checkbox"/>	9/7/99	9/7/99	1
1779	AMCCRAY@GEOCITIES.COM	NOVELL	<input type="checkbox"/>	9/7/99	9/7/99	1
1778	SPAM@PHOG.COM	YOMAMA	<input type="checkbox"/>	9/7/99	9/7/99	1
1777	JOSEPHA@BEST.COM	KANA	<input type="checkbox"/>	9/7/99	9/7/99	1
1783	GABBU23@HOTMAIL.COM	MYPASSWORD86489	<input type="checkbox"/>	9/7/99	9/7/99	1
1790	RAY.SHARMA@CSFB.COM	MULLEN7	<input type="checkbox"/>	9/7/99	9/7/99	1
1771	PBLYTHE@EARTHLINK.NET	REDDOG	<input type="checkbox"/>	9/6/99	9/6/99	1
1713	RBHARTMAN@HOME.COM	SOPHIE	<input type="checkbox"/>	9/6/99	9/6/99	1
1714	JEWLWAR@AOL.COM	CASEY	<input type="checkbox"/>	9/6/99	9/6/99	1
1715	KAYANDFRANKINHUDSON@ATT.N	VERITAS	<input type="checkbox"/>	9/6/99	9/6/99	2
1716	RCSAPEETS@AOL.COM	SALLY	<input type="checkbox"/>	9/6/99	9/6/99	1
1717	JTHOMAS@TYPHOON.COEDU.USF	3388H	<input type="checkbox"/>	9/6/99	9/6/99	1
1718	LEE@NET2PHONE.COM	PATTY	<input type="checkbox"/>	9/6/99	9/6/99	1
1719	EELISO1@TAMPABAY.RR.COM	SHAYNE	<input type="checkbox"/>	9/6/99	9/6/99	1
1720	PAULARMSTRONG2@COMPUSERVE	LOVE	<input type="checkbox"/>	9/6/99	9/6/99	1
1722	ALLIEDMCCS@MSN.COM	HOLLYDOG	<input type="checkbox"/>	9/6/99	9/6/99	1
1723	HSJUALY@HOTMAIL.COM	900210	<input type="checkbox"/>	9/6/99	9/6/99	2
1712	DANCINGHEART@WEBTV.NET	83148314	<input type="checkbox"/>	9/6/99	9/6/99	2

FIG. 8

900

USE THE  
CONTROL  
BELOW TO ADD,  
EDIT, OR DELETE  
A KEYWORD

ADD  
EDIT  
DEL

USER: DIVES@VICTORYSYS.COM

KEYWORD OR PHRASE	NOTIFICATION REMAINING	SET TO 3
ALCOA	2	●
AMD	3	●
ANOTHER OUTAGE	3	●
AOL	2	●
APPLIED MATERIALS	3	●
AQUARION	3	●
ARIBA	2	●
ATHOME	3	●
AUTO ANALYSTS	3	●
AUTO ANALYSTS	3	●
BELOW EXPECTATIONS	3	●
BEZOS	3	●
BIOGEN	3	●
BLODGETT	3	●
BLOOMBERG	0	●
BLUEFISH	3	●
BRIDGEPORT	1	●
BRISTOL-MYERS	2	●
CHILD SUPPORT	3	●
CIENA	3	●
COPPER MOUNTAIN	3	●
CREE	3	●
DELL	0	●
DESTIA	3	●
DITECH	3	●

902

904

906

FIG. 9

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1000

ADD KEYWORD OR PHRASE

USER: *DIVES@VICTORYSYS.COM*

KEYWORD OR PHRASE TO BE ADDED:

PLEASE CONFIRM THE TYPES OF PROGRAMMING YOU WANT US TO WATCH:

☒ NEWS    ☒ FINANCE    ☒ KIDS    ☒ ENTERTAINMENT

☒ SPORTS    ☒ PUBLIC AFFAIRS/POLITICS    ☒ MISC.

☒ ADVANCED FILTERING

FIG. 10

EDIT KEYWORD OR PHRASE PREFERENCES

USER: *DIVES@VICTORYSYS.COM*

KEYWORD OR PHRASE TO EDIT:

PLEASE CONFIRM THE TYPES OF PROGRAMMING YOU WANT US TO WATCH:

☒ NEWS   ☒ FINANCE   ☒ KIDS   ☒ ENTERTAINMENT

☒ SPORTS   ☒ PUBLIC AFFAIRS/POLITICS   ☒ MISC.

☒ ADVANCED FILTERING

FIG. 11

1200

DELETE KEYWORD OR PHRASE

USER: *DIVES@VICTORYSYS.COM*

KEYWORD OR PHRASE TO BE DELETED:

FIG. 12

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1300

DAVID IVES

---

FROM: RESULTS@TVEYES.COM  
SENT: TUESDAY, SEPTEMBER 7, 1999 9:40 AM  
TO: DIVES@VICTORYSYS.COM  
SUBJECT: YAHOO

YOUR KEYWORD(S), YAHOO, WAS RECENTLY SPOKEN ON CNBC DURING  
SQUAWK BOX.

TUESDAY, SEPT. 7, 1999 AT 9:39 AM

.....LOSSES TO REFLECT THE DIVIDENDED TO PREFERRED SHAREHOLDERS.  
INTEL DOWN A BUCK. AMAZON DOWN 1. YAHOO! DOWN 1. ....

FOR DETAILS, VISIT [HTTP://WWW.TVEYES.COM/DATABASE/  
EXPAND.ASP?IN=237634&KEY=YAHOO](http://www.tveyes.com/database/expand.asp?in=237634&key=yahoo)

1302

BE SURE TO FOLLOW THE ABOVE LINK TO KEEP YOUR ACCOUNT ACTIVE FOR  
THIS KEYWORD.

*FIG. 13*

YOUR KEYWORD(S): YAHOO

← VIEW OTHER HITS TODAY →

CNBC 9/7/99 - 9:38:49

AM .....WARBURG DILLON REED REITERATES A  
BUY ON APPLE AND REACHED A  
SETTLEMENT IN A SHAREHOLDER  
DERIVATIVE AX PENDING SINCE 1996,  
WARBURG DILLON REED REITERATE AS BUY.  
DURAMED DOWN, A LOSS OF 7/16, RESTATE  
'86 - 897 AND '98 EARNINGS. LOSSES TO  
REFLECT THE DIVIDENDED TO PREFERRED

1402 SHAREHOLDERS. INTEL DOWN A BUCK. AMAZON DOWN 1.  
YAHOO! DOWN 1. CMGI DOWN 9/6 AND THE CHIP SECTOR DOWN  
FRACTIONLY, BACK TO YOU. MARK: THANK YOU VERY MUCH ,  
TOM COSTELLO. LETS SHOOT OVER TO DAVID FOR A QUICK  
UPDATE ON WHAT'S MOVING. DAVID: THANK YOU, MARK. AS I'VE  
BEEN DO, CONTINUE TO FOCUS ON VIACOM AND CBS.  
INCREDIBLE NUMBER OF BRAND NAME ASSETS THEY ARE  
GETTING TOGETHER THERE AND WHEN THE BANKERS AT EVER  
CORE AND MORGAN STANLEY WILL PUTTING THIS TOGETHER,  
WHICH WAS A SHORT AMOUNT OF TIME, THEY EXPECTED THE  
VIACOM STOCK UP SHARPLY TODAY, SOME SPECULATED A 15  
TO 20% RISE. WE HAVEN'T SEEN THE TRADING YET, BUT MARIA  
INDICATE IT HAD WOULD IN THE OPEN SHARP LEHIGHER AT THIS  
POINT T. IS AN AT MARKET DEAL. IT IS OPEN, SAYS JOE. JOE, I  
BIKE THE B. UP TO 47. DAVID: NOT BAD, BUT NOT PERHAPS  
WHAT THEY HAD HOPED FOR GIVEN THE FACT THEY ARE NOT  
TAKING ON ANY DEBT, THEIR CREATESING A NEW COMPANY  
THAT WILL HAVE A PLACE, AS YOU HEARD CHRIS SAY EARLIER,  
RIGHT AT THE TABLE WITH THE LIKES OF DISNEY, NEWS CORP,  
TIME WARN AND THE LIKE. IT IS A STOCK DEAL, AS WE TOLD  
YOU. KARMAZIN WILL BE PRESIDENT AND COO. SUMNER  
REDSTONE WILL BE THE.....

FIG.14

FIG. 15

1500

SYMBOL	a	EXCHANGE	b	COMPANY
MANH		NASD		MANHATTAN ASSOCIATES
BGLSQ		NASD		MANHATTAN BAGEL CO
MTW		NYSE		MANITOWOC CO
MTEX		NYSE		MANNATECH
MNR		NYSE		MANOR CARE
MAN		NYSE		MANPOWER WIS
MANS		NASD		MANSUR INDUSTRIES
MHC		NYSE		MANUFACTURERS HOME CMNTY
MANU		NASD		MANUGISTICS GROUP
MAPX		NASD		MAPICS
MAPS		NASD		MAPINFO
MFCV		NASD		MARATHON FINANCIAL
MRCM		NASD		MARCAM SOLUTIONS
MIGAS		NASD		MARCUM NATURAL GAS SERVIC
MCS		NYSE		MARCUS
CGUL		NASD		MARGATE INDS
MRGO		NASD		MARGO CARIBE
MRL		NYSE		MARINE DRILLING COS
MMSY		NASD		MARINE MGMT SYS
MMSYW		NASD		MARINE MGMT SYS
MARPS		NASD		MARINE PETROLEUM TRUST
MTLX		NASD		MARINE TRANSPORTORAT
HZO		NYSE		MARINEMAX
FMARP		NASD		MARINER CAPITAL TRUST PFD



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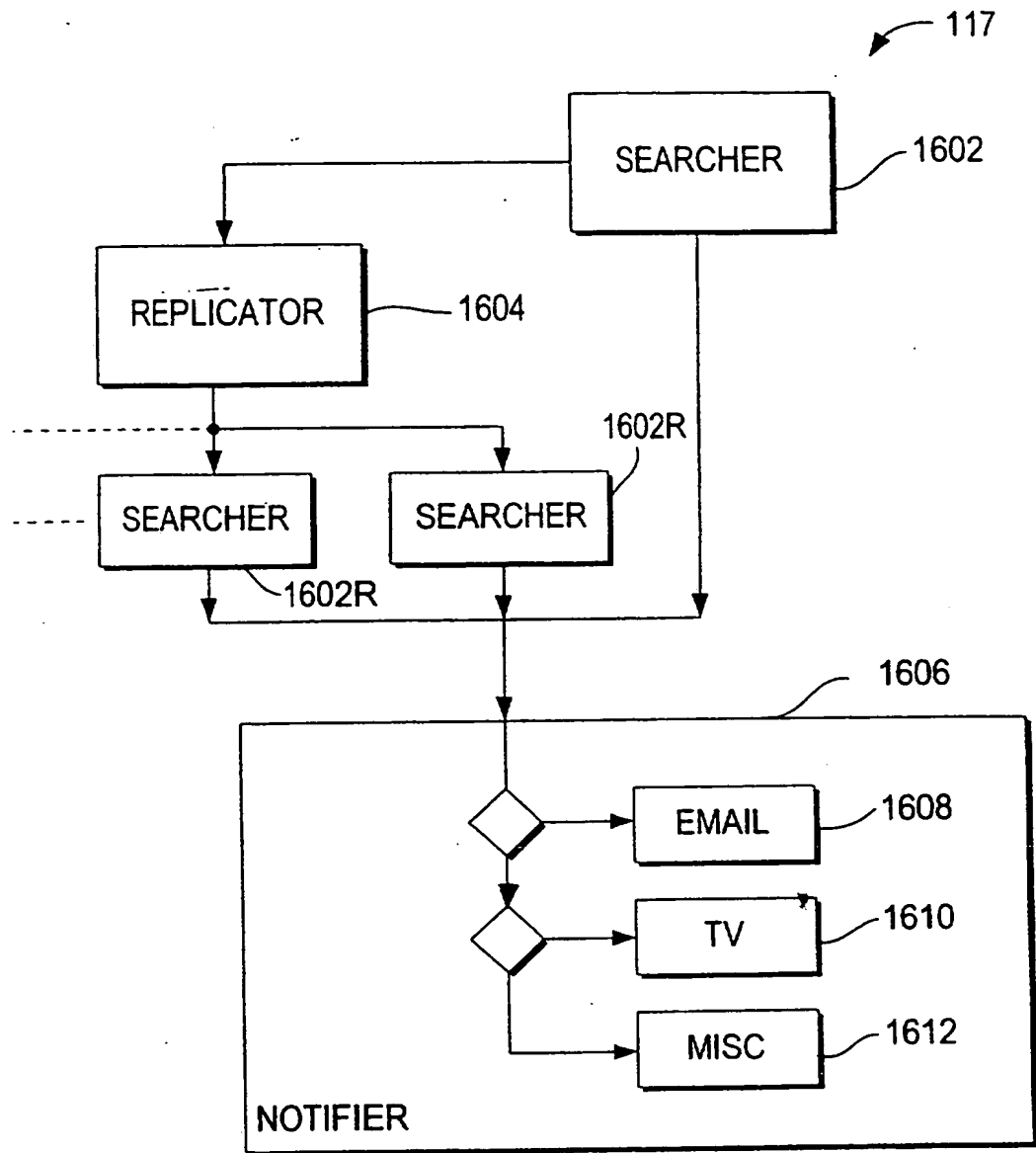


FIG. 16

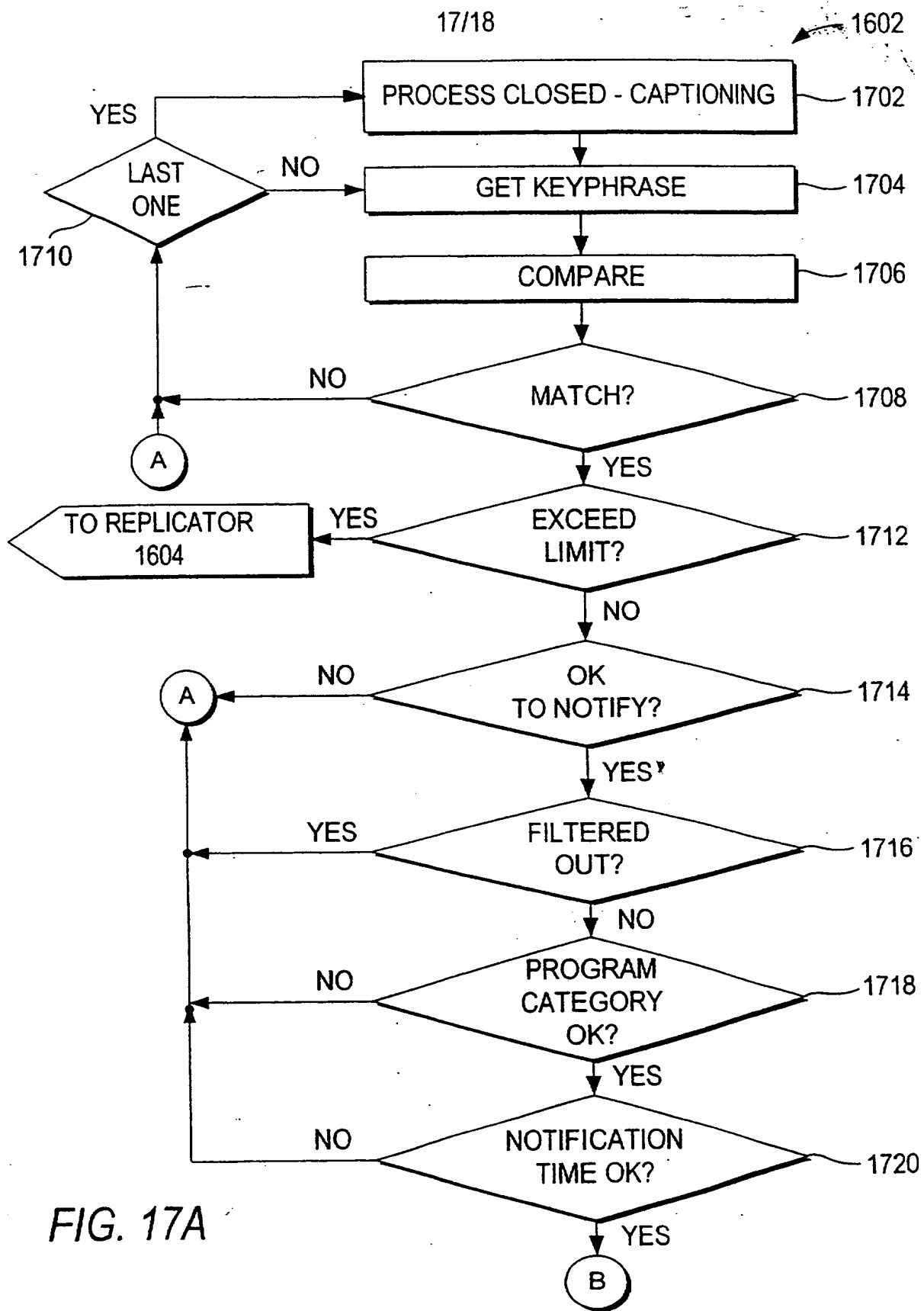
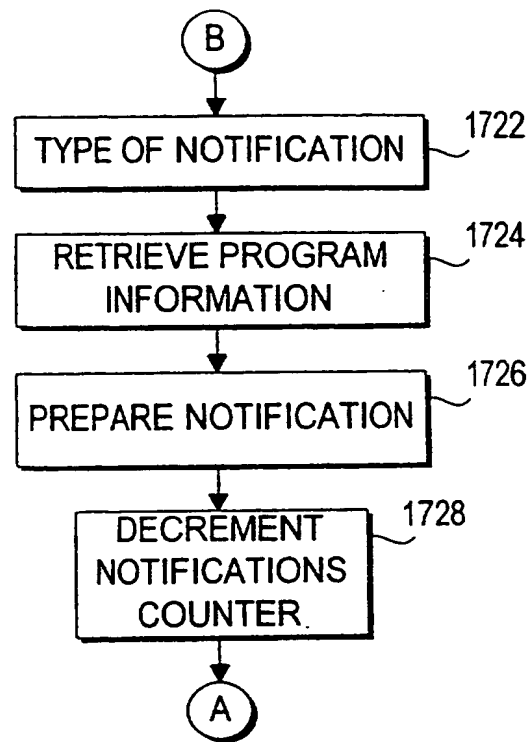


FIG. 17A

**FIG. 17B**

2358938

AUTOMATED REAL-TIME CONTINUOUS SEARCHING  
OF CLOSED-CAPTIONED TELEVISION PROGRAMMING

Cross Reference to Related Application

This claims the benefit of United States  
5 Provisional Application No. 60/153,119, filed  
September 8, 1999.

Background of the Invention

This invention relates to automated searching  
of closed-captioned television programming for  
10 information requested by a user. More particularly,  
this invention relates to automated searching of  
closed-captioned television programming for requested  
information substantially as that programming is being  
broadcast.

15 Vast amounts of information ranging from  
world news to Cajun cooking are available today via  
television (TV). In many geographic areas, cable TV or  
satellite TV providers offer more than one hundred  
television channels. Programming on most of these  
20 channels is broadcast 24 hours per day, seven days per  
week. Many channels are dedicated to a single TV  
network, while others may be shared between two or more  
networks that each broadcast during a different time  
slot. Furthermore, many networks provide only  
25 specialized programming, such as, for example, classic  
movies, classic sitcoms, financial news, science  
fiction, comedy, cooking, and cartoons.

For most viewers, however, finding specific information on television (e.g., news of a particular corporate merger or of a new drug entering the market) is nearly impossible, even with today's most sophisticated program guides. These guides typically provide program names, broadcast times and channels, and perhaps a general summary of the programs' content. Accordingly, viewers are left with few alternatives. They can review a program guide and then watch or record selected programs hoping that one or more of those programs will include the sought after information. Or, they can tune to a particular channel on which the desired information is likely to be broadcast, and then hope that it is. Or, viewers can just channel surf and hope to randomly come across a program just then broadcasting the information of interest. These options are all very time consuming and in no way guarantee that viewers will find the information they are looking for.

In view of the foregoing, it would be desirable to provide systems and methods that automatically and continuously search television programming in real time for information requested by a user.

It would also be desirable to provide systems and methods that automatically notify a user in real time upon finding requested information in a television program substantially as that program is being broadcast.

It would further be desirable to provide systems and methods that automatically continue searching for requested information in other television programming after that information has been found in a television program.

It would still further be desirable to provide systems and methods that upon notifying a user

of requested information found in a television program provide additional information related to the requested information.

Summary of the Invention

5 It is an object of this invention to provide systems and methods that automatically and continuously search television programming in real time for information requested by a user.

10 It is also an object of this invention to provide systems and methods that automatically notify a user in real time upon finding requested information in a television program substantially as that program is being broadcast.

15 It is a further object of this invention to provide systems and methods that automatically continue searching for requested information in other television programming after that information has been found in a television program.

20 It is still a further object of this invention to provide systems and methods that upon notifying a user of requested information found in a television program provide additional information related to the requested information.

25 In accordance with this invention, a system is provided that continuously searches closed-captioned television programming in real time for information requested by a user. The requested information is in the form of keywords or phrases. The system notifies the user in real time upon finding a keyword or phrase  
30 in the closed-captioned television programming. The system includes a computer and software executable on the computer. The software compares word by word each keyword and phrase to decoded closed-captioned information substantially as the decoded  
35 closed-captioned information is received by the

computer. The software notifies the user in real time upon finding a keyword or phrase in the decoded closed-captioned information.

The system preferably also includes a receiver operative to receive closed-captioned television programming, a closed-captioned decoder, a file server, and memory for storing decoded closed-captioned information and user requested information.

Other features of the invention preferably include notification of a successful search by, for example, email, voice-mail, message displayed on a user's television screen, or text message sent to a cellular telephone or pager. Searches for requested information continue until the requested information is found a preset number of times. Moreover, the invention preferably prevents redundant notifications, and does not count them, when, for example, requested information is found multiple times in close proximity to each other in the same stream of decoded closed-captioned information. The invention preferably permits users to specify a time period when notifications of successful searches can be sent (e.g., a time period when the user is available to watch television), and also provides users with access to additional information related to the found information. For example, the invention preferably provides users with the following: additional decoded closed-captioned information proximate the found information (e.g., program dialog before and after a user's found keyword); a video segment of the program in which the requested information was found (preferably a 2-minute segment embodying the found information); and information from one or more third-party sources.

Brief Description of the Drawings

The above and other objects and advantages of the invention will be apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which like reference characters refer to like parts throughout, and in which:

FIG. 1 is a block diagram of an exemplary embodiment of a system that automatically and continuously searches closed-captioned television programming in real time in accordance with the present invention;

FIG. 2 is a sample screen display of an information entry page on the World Wide Web (hereinafter "Web") in accordance with the present invention;

FIG. 3 is a sample screen display of a confirmation Web page in accordance with the present invention;

FIGS. 4A-B are an exemplary embodiment of a search database in accordance with the present invention;

FIG. 5 is an exemplary embodiment of a TV programming category database in accordance with the present invention;

FIG. 6 is an exemplary embodiment of a TV programming guide database in accordance with the present invention;

FIG. 7 is a sample screen display of a log-in Web page in accordance with the present invention;

FIG. 8 is an exemplary embodiment of a user profile database in accordance with the present invention;

FIG. 9 is an exemplary embodiment of an individual user account file in accordance with the present invention;



FIGS. 10-12 are sample screen displays of Web pages for adding, editing, and deleting, respectively, search information from a user account file in accordance with the present invention;

5 FIG. 13 is a sample email notification sent by the system of FIG. 1;

FIG. 14 is a sample screen display of a Web page providing additional information related to a successful search;

10 FIG. 15 is an exemplary embodiment of a publicly-traded company database in accordance with the present invention;

FIG. 16 is a logic flowchart of an exemplary embodiment of software that can be executed on the system of FIG. 1 in accordance with the present invention; and

20 FIGS. 17A-B are a more detailed logic flowchart of an exemplary embodiment of a portion of the software of FIG. 16 in accordance with the present invention.

#### Detailed Description of the Invention

Many television programs today are closed captioned, and the current trend is to close caption most, if not all, television programs in the near future. Closed-captioned television programming is ordinary television programming with captions that are typically text of spoken dialog and may be additionally or alternatively, for example, explanatory text or subtitles (e.g., foreign language text). Captions appear on the screen of a television set or display device equipped with an appropriate decoder. Closed captioning permits hearing-impaired persons and those in noisy environments (e.g., taverns, fitness centers, etc.) to more fully enjoy television.

in noisy environments (e.g., taverns, fitness centers, etc.) to more fully enjoy television.

FIG. 1 shows an exemplary embodiment of a system in accordance with the present invention that automatically and continuously searches closed-captioned television programming in real time for information requested by a user. System 100 receives closed-captioned television programming from a source 102. Source 102 can be, for example, one or more of the following: a cable TV provider, a satellite TV provider, air-wave broadcasts of closed-captioned television programming, or any other known source of closed-captioned television programming.

System 100 includes a plurality of receivers 104 that receive television programming from source 102. Each receiver 104 is tuned to receive programming on a particular television channel of source 102. Receivers 104 can be any known receiver compatible with source 102. For example, if source 102 is a cable TV provider, receiver 104 can be, for example, CATV Converter Model 8155 by Inphone Electronics Enterprise Co., Ltd., of Taiwan. If source 102 is a satellite TV provider, receiver 104 can be, for example, Satellite Receiver Model 7M09 E57474, by Thomson Consumer Electronics, Inc., of Lancaster, Pennsylvania, or Dish Direct Silver Edition Satellite Receiver Model HIRD-D1, by Hughes Network Systems, of Germantown, Maryland.

System 100 also includes a plurality of closed-captioned decoders 106 coupled respectively to receivers 104. Decoders 106 decode closed-captioned information from the closed-captioned television programming received by receivers 104. That is, decoders 106 strip out closed-captioned information from the received television signal and convert that information to text, ASCII, or other form suitable for

Industries Technology Group, Inc., of Ponte Vedra Beach, Florida, or a Data Recovery Decoder Model DE 241DR. by EEG Enterprises, Inc., of Farmingdale, New York.

5           Although eight receivers 104 and eight decoders 106 are shown in FIG. 1 for illustrative purposes, system 100 can include other numbers of receivers 104 and decoders 106.

10           Server 108 is preferably a file server that receives information from one or more users 110. A file server is a sophisticated device (often a computer) that stores, maintains, and manages files as users request, change, and store them. Users 110 are coupled to server 108 preferably via the Internet 112,  
15           and server 108 is further preferably an HTTP (hypertext transfer protocol) server that provides a Web site at which users 110 enter and edit information to be searched for and at which users 110 can review successful search results. Alternatively, users 110  
20           can be coupled to server 108 directly from their personal computers (PCs) or workstations, or via an intranet or any other suitable network. Server 108 is preferably a computer that preferably has dual Pentium 800 megahertz processors and 2 gigabytes of random  
25           access memory (RAM). Server 108 preferably runs SQL (structured query language) server software such as that offered by, for example, Microsoft Corporation, of Redmond, Washington.

30           Memory 114 is coupled to server 108 and preferably includes databases of user information and decoded closed-captioned information. Memory 114 is preferably disk space having preferably 100 gigabytes of storage. Alternatively, memory 114 can be any other suitable storage device.

35           Computer 116 is coupled to decoders 106 and server 108 and is preferably PC-compatible having

preferably a Pentium-3 800 megahertz processor, 128 megabytes of RAM, and a 10 gigabyte hard disk. Computer 116 preferably has at least eight parallel input/output channels and a multi-port PCI (peripheral component interconnect) board for receiving at least eight parallel streams of decoded closed-captioned information. The multi-port PCI board can be, for example, a COMM +8 PCI board by Sealevel Systems, Inc., of Liberty, South Carolina. Additional computers 116 can be coupled in parallel to receive additional parallel streams of decoded closed-captioned information from additional television channels received from source 102. Alternatively, computer 116 can be a mid-size or mainframe general purpose computer preferably having multi-processing capabilities and preferably having many more than eight input/output channels for receiving decoded closed-captioned information.

Computer 116 executes software 117, described in more detail below, that compares each stream of decoded closed-captioned information to the information requested by users. This comparison occurs in real time as the decoded information is received from decoders 106. When requested information is found in the decoded closed-captioned information, software 117 notifies via server 108 the user 110 that requested the information.

System 100 preferably also includes a computer 118, similar to computer 116. Computer 118 includes a video capture card that receives television programming from receivers 104. The video capture card can be, for example, an Osprey<sup>®</sup>-100 by ViewCast.com, Inc., of Dallas, Texas, or a Studio DC10 Plus by Pinnacle Systems, Inc., of Pittsburgh, Pennsylvania. Computer 118 executes software 120 that captures television programming from the video capture

card preferably using a Microsoft compliant Visual Basic control included with software such as, for example, RealProducer Plus software by RealNetworks.com (i.e., RealNetworks, Inc.), of Seattle, Washington.

5           Software 120 captures television programming from each receiver 104 in preferably about 2-minute segments, and stores each 2-minute segment in a file that includes the date and the start and end broadcast times of the segment. Preferably these files are  
10 stored in memory 114, with filenames preferably associated with the television channel or network from which the segment was broadcast. When a user's requested information is found in decoded  
15 closed-captioned information, the user can request system 100 to download, or to display at system 100's Web site, a 2-minute video segment corresponding to the decoded closed-captioned information in which the requested information was found. Preferably,  
20 software 120 creates the 2-minute video segment by copying and assembling, as necessary, contiguous portions of stored video segments such that the requested information occurs in the created video segment preferably after about the first 15 seconds. These video segments can be displayed using, for  
25 example, RealServer software by RealNetworks.com.

          System 100 operates preferably as follows: information is received from a user 110 preferably at system 100's Web site. A preferred embodiment of an information entry Web page 200 is shown in FIG. 2 in  
30 accordance with the present invention. A user 110 preferably enters an email return address at input entry field 202. This is the address to which notifications of found information will be sent. Information to be searched for is entered at input  
35 entry field 204 in the form of a keyword or phrase. A keyword is a single word or alphanumeric character

entry field 204 in the form of a keyword or phrase. A keyword is a single word or alphanumeric character string. A phrase is any number of keywords (or alphanumeric character strings) grouped together.

5 (Hereinafter, the term "keyphrase" denotes both "keyword" and "phrase.") Alternatively, a user can provide information to system 100 by email, facsimile, telephone, or other suitable method.

System 100 preferably confirms the  
10 information received from user 110 via a confirmation Web page. FIG. 3 shows an exemplary embodiment of confirmation Web page 300 in accordance with the present invention. Confirmation Web page 300 displays the entered keyphrase 302 and email address 304, and  
15 preferably allows user 110 to modify received information preferably via hyperlink 306, which returns user 100 to information entry Web page 200. A hyperlink is a connection between an element (e.g., word, phrase, or symbol) in, for example, an email, and  
20 another hypertext document, file, or script (e.g., a Web site page).

Server 108 stores information received from users preferably in a database in memory 114. FIG. 4A shows an embodiment of search database 400 according to  
25 the present invention. Database 400 lists keywords and phrases in columns 402 and 404, respectively, and lists associated email addresses in column 406 to which notifications are sent when keywords or phrases are found.

30 System 100 preferably allows users to limit searches to one or more particular types or categories of television programming. FIG. 5 shows an exemplary embodiment of a database 500 maintained by system 100, and preferably stored in memory 114, that lists various  
35 program types 502 and categories 504 that users 110 can specify when entering their keyphrase. Thus, for

example, a user 110 can enter a phrase "stock market" and limit the search for that phrase to television programming categorized as news and finance.

Similarly, a user 100 can limit a search to one or more program types, such as, for example, daytime soaps, talk shows, and games.

A user 110's selection of programming types and categories is also stored in search database 400, as shown with respect to selected program categories in columns 408-414 of FIG. 4B. Additional columns can be added to database 400 to indicate selected program types and other options, some of which are described below.

System 100 preferably maintains and stores in memory 114 a TV programming guide database, an embodiment of which is shown in FIG. 6 in accordance with the present invention. Database 600 lists, for example, television networks whose programming is provided by source 102. Database 600 also lists titles, types, categories, and broadcast times of programs broadcast by the listed television networks. Programming guide data for database 600 can be obtained from, for example, cable or satellite TV providers or third parties.

Preferably, users can also specify a time period during which closed-captioned television programming should be searched. For example, a user can specify that information regarding a particular sporting event be searched for only during the month of October. System 100 stores this search-time limitation in database 400 and then only searches for the requested information in decoded closed-captioned information received during October.

Similarly, users can preferably specify that searches for requested information be made in only the programming of a limited number of TV networks or

channels. For example, a user may specify that searches for "inflation" be made in only the programming of a particular financial news network. System 100 stores this search limitation in database 400 and then only searches programming in accordance with that limitation.

In a preferred embodiment of the present invention, user information is also preferably stored and maintained in user files that users can access preferably via a password. FIG. 7 shows an exemplary embodiment of a Web page screen in accordance with the present invention at which established users can enter their password to access their files, or at which a new user can establish a password for future access to that user's file.

System 100 preferably maintains a user profile database listing user IDs, email addresses, and passwords. User IDs are assigned by system 100 upon a user first establishing a password. FIG. 8 shows an embodiment of user profile database 800 in accordance with the present invention.

An embodiment of a user account file 900 in accordance with the present invention is shown in FIG. 9. Each keyphrase entry 902 represents a separate search conducted substantially simultaneously. Upon gaining access to their files, users can add, edit, or delete search information. FIGS. 10, 11, and 12 show respective embodiments of Web page screens 1000, 1100, and 1200 in accordance with the present invention at which additions, edits, and deletions of search information can be entered. Upon users modifying their account files 900, database 400 is updated accordingly.

Preferably, system 100 performs a preset number of successful searches before requiring a user to request continuation of the same search. As shown in FIG. 9, column 904 represents the number of



notifications remaining (i.e., the number of successful searches still to be performed). For example, system 100 will automatically continue searching for the keyword "auto analyst" until that keyword is found  
5 three times. After the third time, system 100 preferably resets the notifications remaining counter upon the user accessing additional information provided by system 100 that pertains to the last successful search. This additional information is described  
10 further below. Alternatively, if after the third successful search users wish to continue the same search, they can reset the notifications remaining counter by accessing their files via password and then clicking on the corresponding button 906. Note that  
15 while in this embodiment the preset number of successful searches that system 100 will perform is three, other numbers of successful searches can be preset.

System 100 preferably filters successful  
20 searches, and does not count them, if they are redundant. Accordingly, redundant notifications are prevented. System 100 preferably performs three levels of filtering. First, if the same keyphrase is found within close proximity of a previous find of that  
25 keyphrase, the latter find is ignored. "Close proximity" can be defined in terms of time (e.g., within 30 seconds) or in terms of line segments (e.g., within 20 line segments). A line segment is about four or five words (i.e., spoken or explanatory text words,  
30 not computer words), which about equals a closed-captioned line displayed on a TV screen.

Second, if the same keyphrase is found in the same stream of decoded closed-captioned information more than a preset number of times within a preset time  
35 period, those occurrences of that keyphrase exceeding those limits are ignored. For example, system 100 will

ignore more than three occurrences of a keyphrase found in the same stream of decoded closed-captioned information within 30 minutes of each other.

The third filtering that system 100 preferably performs is a user specified "stop/repeats" filtering. If a found keyphrase appears to have been found in a repeat of the same program in which that keyphrase was recently found (e.g., within the last two days), that find would be ignored if the user so specified. "Stop/repeats" information is stored for each user in column 422 of database 400.

System 100 preferably allows users who do not wish to be notified around the clock of successful searches to specify a time period during which they can be notified of successful searches. For example, a user may specify that notifications, both real time and those indicating or summarizing previous successful searches prior to the specified time period, be sent between 6:00 PM and 10:00 PM daily, which is when that user generally has time to review previous search results and is available to watch television should that user be notified of a TV program being broadcast that includes information requested by the user.

System 100 uses software 117 to find user requested information. Software 117 compares user requested information (i.e., keyphrases) with decoded closed-captioned information. Software 117 takes line segments of decoded closed-captioned information, breaks the segment up into its individual words, and stores those words in an array in RAM or other temporary storage. Each word is then separately compared to each word of each keyphrase stored in system 100.

Upon finding requested information in decoded closed-captioned information, system 100 notifies the user preferably by email. FIG. 13 shows an exemplary

embodiment of an email 1300 used to notify a user of a successful search in accordance with the present invention. Alternatively, users can be notified by facsimile, voice-mail, a message displayed on their TV screen (e.g., in the form of a banner or other type of suitable overlay), a message displayed on their computer screen (e.g., in the form of a ticker-tape-style display), a text message sent to a cellular telephone or pager, or any other suitable method.

Notifications preferably include the name, broadcast time, network, and channel of the TV program in which the requested information was found, and preferably a brief portion or snippet of closed-captioned text surrounding the occurrence of the requested information. An email notification also preferably includes a hyperlink 1602 to a Web page that provides additional closed-captioned information from the program in which the requested information was found. This additional information is preferably proximate the requested information.

FIG. 14 shows an exemplary embodiment of an additional information Web page 1400 that a user can access after notification of a successful search. The user's keyphrase 1402 is preferably highlighted in some manner so that the user can easily see where in the additional information the keyphrase appears. Alternatively, other means of providing access to additional closed-captioned information can be provided. For example, users can call a specified telephone number to either listen to a recording of the additional information or order a hardcopy. Or, users can receive additional information by email or facsimile.

System 100 preferably provides users with access to related information from sources other than

the program in which the requested information was found. For example, system 100 preferably compares information to be searched for with names of companies whose stock is publicly traded. System 100 preferably  
5 maintains a database 1500 of publicly-traded companies, as shown in FIG. 15, to which a user's requested information is compared. If a user's requested information includes the name of a publicly-traded company listed in database 1500, then the email  
10 notifying the user of a successful search preferably also includes a hyperlink to one or more sources at which that user can obtain, for example, current stock market or other financial information about that company.

15 System 100 preferably maintains a notifications database that includes a record of every email notification sent to users, and of every user's access of the additional information provided by system 100. These records are useful for, among other  
20 things, marketing purposes.

System 100 preferably also maintains a captioning database that includes a copy of all decoded closed-captioned information received over a period of time. This period of time is dependent upon the amount  
25 of storage available for storing the decoded closed-captioned information. Preferably, each stream of decoded closed-captioned information (typically from a particular television channel) is stored separately.

FIG. 16 represents an exemplary embodiment of  
30 software 117 in accordance with the present invention. Software 117, executable on computer 116, includes the following functions: searcher 1602, optional replicator 1604, and notifier 1606. Notifier 1606 preferably includes email notifier 1608, TV  
35 notifier 1610, and miscellaneous notifier 1612. These functions can be encoded as follows: a single computer

program, four modules or subroutines of a single computer program, four separate programs appropriately linked together, or any other program or group of programs executable on computer 116. Moreover, if software 117 is encoded as separate programs, each program preferably can be executed in parallel on separate computers 116 (or on separate processors of a multi-processor computer 116) appropriately linked together such that system 100 operates properly. Each computer 116 can be customized (with respect to, e.g., processor speed, hard disk and RAM capacities, etc.) to effectively and efficiently execute its respective portion of software 117 in accordance with system 100 operation and real-time performance objectives.

Searcher 1602 searches an incoming stream of decoded closed-captioned information in real time for keyphrases entered by users. Each word of the decoded closed-captioned information is compared with each word of each user's keyphrase. A separate duplicate searcher 1602 executes in parallel for each stream of decoded closed-captioned information received from a decoder 106. Each stream typically represents programming from a single television channel. Upon finding a keyphrase, searcher 1602 creates appropriate notification data.

Replicator 1604 is invoked if the number of users requiring notification of a successful find of the same information exceeds a predefined limit. Replicator 1604 launches one or more additional searchers 1602R as needed to continue processing the found keyphrase (e.g., checking individual user files and creating appropriate notifications). Each searcher 1602R preferably processes notifications for each user having requested the same found keyphrase. Searchers 1602R may be functionally the same as searcher 1602 or, alternatively, may include only the

notifications processing capability of searcher 1602. The found keyphrase and associated user data are passed to searchers 1602R from searcher 1602 through replicator 1604. Upon completing its notifications processing, each searcher 1602R self-terminates. Searchers 1602R allow searcher 1602 to continue real-time searching of incoming streams of decoded closed-captioned information.

Notifier 1606 preferably notifies users of successful finds by email. Email notifier 1608 scans an email database for records that need to be transmitted to users. Each sent email has a corresponding record in the database. Email notifier 1608 retrieves all pending records in the email database and processes each one individually. As each record is processed and emailed, the record is updated accordingly. Optionally, and where appropriate, email notifier 1608 adds advertising to the email. Preferably, email notifier 1608 can execute on a separate computer 115.

Additionally or alternatively to email notifications, TV notifier 1610 notifies users by overlaying or displaying a notification on the user's television screen. TV notifier 1610 processes notification data created by searcher 1602 (e.g., TV program information and appropriate addressing information) and transmits the notification accordingly.

Similarly, miscellaneous notifier 1612 notifies users by methods other than email or television, such as, for example, by sending a text message to a pager or cellular telephone (capable of receiving such a message). Miscellaneous notifier 1612 also preferably includes a ticker-tape program that users can download to their computer. Notifications

sent to a user's computer: appear on the computer's screen as a ticker-tape-style message.

FIG. 17 represents a more detailed exemplary embodiment of searcher 1602 in accordance with the present invention. At 1702, searcher 1602 processes preferably one line segment of decoded closed-captioning. That line is broken up into individual words and stored in a segment array. The segment array is preferably stored in RAM or other temporary storage and includes the words of at least three line segments.

At 1704, searcher 1602 retrieves a keyphrase from search database 400 and stores it in RAM or other temporary storage. Keyphrases are retrieved preferably sequentially per user. If the keyphrase is a keyword, searcher 1602 preferably first checks the keyword to ensure that it is not meaningless. For example, keywords such as "the" and "it" occur too frequently in closed captioning to be of any value as a keyword and are thus ignored. (Such words, however, may be of value in a phrase, and thus phrases are not checked).

At 1706, searcher 1602 compares a decoded closed-captioned word to a keyphrase. If the keyphrase is a keyword, a word-to-word comparison is made. If the keyphrase is a phrase, then searcher 1602 compares that phrase with about three closed-captioned line segments, depending on the length of the phrase.

If the closed-captioned information (i.e., word or line segments) does not match the keyphrase at 1708, searcher 1602 retrieves another keyphrase, provided that the prior keyphrase was not the last one in database 400 (this is checked at 1710). If the prior keyphrase was the last one, then the oldest line segment stored in the segment array is cleared and a new line segment is processed (broken up into individual words and stored in the segment array).

If the closed-captioned information matches a keyphrase, searcher 1602 checks at 1712 whether the number of users requesting searches of that keyphrase exceeds a preset number. If it does, searcher 1602  
5 notifies replicator 1604 to help with notifications processing. Note that searchers 1602R preferably perform 1714, 1716, 1718, 1720, 1722, 1724, 1726, and 1728.

At 1714, searcher 1602 determines whether a  
10 user is authorized to receive a notification by checking that user's notifications remaining counter. If authorized, an alert flag is set. If not, searcher 1602 returns to 1710.

At 1716, the found keyphrase is filtered for  
15 redundancy. If the keyphrase is found to be redundant, the alert flag is turned off and searcher 1602 returns to 1710. Searcher 1602 preferably performs two levels of redundancy filtering. The first level ignores a  
20 found keyphrase if that keyphrase had been previously found within a preset number of line segments (e.g., 20 line segments). The second level of filtering ignores a found keyphrase if that keyphrase had been found in the same stream of decoded closed-captioned information more than a preset number of times (e.g., three) within  
25 a preset time period (e.g., 30 minutes).

Searcher 1602 preferably performs at user request a third level of filtering intended to prevent notifications of requested information found in the same TV program that may have been broadcast at  
30 different times. To perform this filtering, system 100 maintains a database of the last five email notifications per user per found keyphrase. This database includes decoded closed-captioned line segments proximate the found keyphrase. If a user  
35 requests this filtering, searcher 1602 takes a preset number of closed-captioned line segment words from



before and after the currently found keyphrase (e.g., about eight words before and about eight words after, preferably not including articles such as "a" and "the"), and compares them to about the same number of  
5 line segment words before and after each of the last five occurrences of that keyphrase found for that user. If the words from the current find match the words from any of the last five by a preset percentage, that current find is considered to be from a repeated TV  
10 program and is ignored. The preset percentage can range, for example, from 60% to 100%.

At 1718, search database 400 is checked to determine whether the user had selected a particular category, type, channel, or TV network of programming  
15 to search. If so, the TV program in which the requested information is found is checked. If that TV program does not match what the user selected, the alert flag is turned off and searcher 1602 returns to 1710.

20 At 1720, searcher 1602 checks the search database 400 to determine whether a particular time period for notifications was specified. If a time period was specified and the current keyphrase find is not within that time period, this find and its  
25 associated information is stored for notification to that user during the specified time period.

At 1722, search database 400 is checked to determine what type of notification was requested (e.g., email, TV, voice-mail, etc.).

30 At 1724, searcher 1602 determines the TV program title from the TV programming guide database in accordance with the channel, date and broadcast time of the closed-captioned programming in which the requested information was found. Searcher 1602 then stores this  
35 information in the notifications database.

Notifications are prepared at 1726. If an email notification was requested, the email is setup as follows: the subject of the email is assigned in accordance with the keyphrase. If the keyphrase is a phrase, spaces are replaced with Web browser compliant %20. If the keyphrase is a keyword, any ampersands contained therein are replaced with %26. The user's email address is then assigned. If the email address is improperly formatted (e.g., incorrectly entered by the user), searcher 1602 reformats the address to point to a system 100 administrator account. A snippet of the closed-captioned information (e.g., about six line segments) is included in the email. The following email notification information is stored in the notifications database: sent date, sent time, sent flag, recipient user address, television channel on which the information was found, start and end positions of the captioning text from the captioning database for that channel, keyphrase, television program name, current captioning line, prior captioning line, and Internet URL address to where this notification can be viewed on the Internet.

The email notification information is then compiled. This includes preferably formatting the email with HTML (hypertext markup language), storing the header, storing the snippet of closed-captioned text that surrounds the keyphrase, and storing any email trailers, such as, for example, a note informing the user that this notification is the user's last unless they reset the notifications remaining counter. The compiled email information, which is now a record, is inserted in an email table for email notifier 1608 to retrieve and send out.

After the email is sent, the record of this notification stored in the notifications database is updated. This database preferably always includes the

last five emails for each keyphrase sent to the same user.

At 1728, the notifications remaining counter is decreased by one. Searcher 1602 then returns  
5 to 1710.

Optionally, system 100 also performs searches of closed-captioned television programming for predetermined system keyphrases, and maintains a database of successful searches. Such a system  
10 keyphrase database is useful for marketing purposes (e.g., to show a potential user how many times and in what television programs a keyphrase of likely interest had been found). Searching for and maintaining a database of successful searches of predetermined system  
15 keyphrases can also be useful for creating or enhancing stored lists of, for example, publicly-traded companies, sports teams, and celebrities. These lists may be of interest to certain types of users (e.g., advertisers looking for a celebrity currently in the  
20 spotlight). Such lists may also be used to provide additional historical information to users requesting related searches. For example, a user requesting a search of a particular publicly-traded company can be provided with a historical record of television  
25 programs that recently discussed a publicly-traded competitor of that company.

Software 117 performs system keyphrase searches substantially identical to, or similar to, user requested keyphrase searches, including redundancy  
30 filtering. Upon finding a system keyphrase, the information preferably stored in the system keyphrase database includes: TV program name, date, broadcast time, television channel, keyphrase, preferably two lines of text from the keyphrase match (e.g., current  
35 line segment and prior line segment), start position in the captioning database for the current channel, and

end position in the captioning database for the current channel.

In sum, system 100 advantageously searches closed-captioned television programming automatically and continuously in real time for information requested by users. System 100 advantageously notifies those users in real time upon finding their requested information. In other words, system 100 preferably receives, decodes, and compares closed-captioned television programming with information received from users, and notifies those users of successful searches in real time such that in many cases, users may tune to the television program in which the requested information was found while that program is still being broadcast.

Thus it is seen that systems and methods are presented that automatically and continuously search closed-captioned television programming in real time for requested information. One skilled in the art will appreciate that the present invention can be practiced by other than the described embodiments, which are presented for purposes of illustration and not of limitation, and the present invention is limited only by the claims which follow.

WE CLAIM:

1. A system that continuously searches closed-captioned television programming in real time for information requested by a user, said system comprising:

5 a computer having a processor, random access memory, hard disk, and at least one input/output port operative to receive information to be searched for from a user and to receive decoded closed-captioned television programming; and

10 software executable on said computer to compare said received information to said decoded closed-captioned information substantially as said decoded closed-captioned information is received by said computer and to notify said user in real time of  
15 finding said received information in said decoded closed-captioned information.

2. The system of claim 1 wherein said received information comprises a keyword.

3. The system of claim 2 wherein said software compares each word of said decoded closed-captioned information to said keyword.

4. The system of claim 1 wherein after finding said received information in said decoded closed-captioned information, said software continues to compare said received information to decoded  
5 closed-captioned information received after said requested information is found.

5. The system of claim 4 wherein said software does not notify said user of a subsequent find of said received information when said subsequent find

is within close proximity of a previous find of said  
5 received information.

6. The system of claim 5 wherein said close  
proximity is a time period of less than about 30  
minutes.

7. The system of claim 5 wherein said close  
proximity is about 20 line segments of said decoded  
closed-captioned information.

8. The system of claim 1 wherein said  
received information and said decoded closed-captioned  
information comprises words of text, said software  
comparing each text word of said received information  
5 to each text word of said decoded closed-captioned  
information.

9. The system of claim 1 wherein said  
random access memory has at least about 50 megabytes of  
storage, said hard disk has at least about 5 gigabytes  
of storage, and said processor operates at at least  
5 about 500 megahertz.

10. A system that continuously searches  
closed-captioned television programming in real time  
for information requested by a user, said system  
comprising:

5 a receiver operative to receive  
closed-captioned television programming;  
a closed-captioned decoder coupled to  
said receiver, said decoder operative to decode  
closed-captioned information from said closed-captioned  
10 programming;

a file server operative to receive information to search for from a user, said server having a processor;

memory coupled to said server, said  
15 memory operative to store said received information and said decoded closed-captioned information;

a computer coupled to said decoder and to said server, said computer having a processor, random access memory, and hard disk; and

20 software executable on said computer to compare said received information to said decoded closed-captioned information substantially as said closed-captioned information is decoded by said decoder and to notify said user in real time of said received  
25 information found in said decoded closed-captioned information.

11. The system of claim 10 wherein said received information comprises a keyword.

12. The system of claim 10 wherein said user is notified by email of received information found in decoded closed-captioned information.

13. The system of claim 10 wherein said computer random access memory has a capacity of at least about 64 megabytes, said computer hard disk has a capacity of at least about 10 gigabytes, and said  
5 computer processor operates at at least about 800 megahertz.

14. The system of claim 10 wherein said server is a hypertext transfer protocol server.

15. The system of claim 10 wherein said server processor operates at at least about 800 megahertz.

16. The system of claim 10 wherein said memory is a disk drive.

17. The system of claim 10 wherein said memory has at least about 80 gigabytes of storage.

18. The system of claim 10 further comprising:

a second computer coupled to said receiver and to said computer, said second computer  
5 having a processor, random access memory, a hard disk, an input/output port operative to receive television programming, and a video capture card; and  
software executable on said computer to capture and store segments of received closed-captioned  
10 television programming.

19. A method of searching closed-captioned television programming in real time for information requested by a user, said method comprising:

- (a) receiving information to search for;
- 5 (b) receiving closed-captioned television programming;
- (c) decoding closed-captioned information from said closed-captioned programming;
- (d) comparing said received information  
10 to said decoded closed-captioned information substantially as said closed-captioned information is decoded; and
- (e) notifying said user in real time of finding said received information in said decoded  
15 closed-captioned information.



20. The method of claim 19 wherein said received information comprises a keyword.

21. The method of claim 19 wherein said receiving information comprises receiving information via the Internet.

22. The method of claim 19 further comprising storing said decoded information in a database.

23. The method of claim 19 further comprising storing segments of received closed-captioned television programming in a database.

24. The method of claim 19 further comprising selecting closed-captioned programming received during a particular time period with which said comparing is to occur.

25. The method of claim 19 wherein said closed-captioned television programming is categorized, said method further comprising selecting a closed-captioned programming of a particular category with which said comparing is to occur.

26. The method of claim 19 wherein said closed-captioned television programming is provided by a plurality of television networks, said method further comprising selecting closed-captioned programming of a particular television network with which said comparing is to occur.

27. The method of claim 19 wherein said notifying comprises notifying said user via the Internet.

28. The method of claim 19 wherein said notifying comprises notifying said user by email.

29. The method of claim 19 wherein said notifying comprises notifying said user by facsimile.

30. The method of claim 19 wherein said notifying includes a program name and channel on which said received information was found.

31. The method of claim 19 further comprising providing a user with access to additional information related to said received information found in said decoded closed-captioned information.

32. The method of claim 19 wherein said notifying comprises providing a hyperlink to enable a user to obtain additional decoded closed-captioned information proximate said received information found  
s in said decoded closed-captioned information.

33. The method of claim 19 further comprising displaying a video segment corresponding to decoded closed-captioned information in which said received information was found.

34. The method of claim 33 wherein said video segment comprises about 2 minutes of video.

35. The method of claim 19 further comprising comparing said received information to names of companies whose stock is publicly-traded.

36. The method of claim 19 wherein said received information includes a name of a publicly-traded company and said notifying comprises providing a hyperlink to enable a user to obtain  
s financial information pertaining to a said publicly-traded company.

37. The method of claim 19 wherein said notifying further comprises:  
specifying a time period when said notifying can occur; and  
s notifying said user during said specified time period of real-time finds of said received information in said decoded closed-captioned information and of finds of said received information in said decoded closed-captioned information prior to  
10 said specified time period.

38. The method of claim 19 further comprising maintaining said received information in a file modifiable by said user.

39. The method of claim 19 further comprising preventing said notifying from occurring after a first occurrence of said notifying upon finding said received information again in said decoded  
s closed-captioned information in close proximity to a previous find of said received information.

40. The method of claim 39 wherein said close proximity is a time period of less than about 30 minutes.

41. The method of claim 39 wherein said close proximity is a about 20 line segments of said decoded closed-captioned information.

42. The method of claim 19 wherein said comparing comprises comparing each word of said decoded closed-captioned information with each word of said received information.

43. The method of claim 19 further comprising receiving an email address to which notifications are to be sent upon finding said received information in said decoded closed-captioned information.

44. The method of claim 19 wherein said decoding, comparing, and notifying occurs in real-time as said closed-captioned television programming is received.

45. The method of claim 19 further comprising repeating (a) - (e) at least once.



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Application No: GB 0021979.0  
Claims searched: all

Examiner: Russell Maurice  
Date of search: 31 May 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.S): G4A (AUIDB, AUXX)  
Int Cl (Ed.7): G06F 17/30  
Other: ONLINE: WPI, EPODOC, PAJ

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X,P	EP 1031964 A2 Matsushita (see abstract and col 1)	1-3, 10 & 11 at least
X	EP 0648054 A2 IBM (see whole document)	1-3 & 8-11 at least
X	WO 99/41684 A1 Fast TV (see abstract)	1-3 & 10 at least
A	WO 98/26584 A1 Prevue (see abstract)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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